

```
BBBBBBBBBBBBBB      AAAAAAAAAA      SSSSSSSSSSSSSS      RRRRRRRRRRRR      TTTTTTTTTTTTTTTT      LLL
BBBBBBBBBBBBBB      AAAAAAAAAA      SSSSSSSSSSSSSS      RRRRRRRRRRRR      TTTTTTTTTTTTTTTT      LLL
BBBBBBBBBBBBBB      AAAAAAAAAA      SSSSSSSSSSSSSS      RRRRRRRRRRRR      TTTTTTTTTTTTTTTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBBBBBBBBBBBBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBBBBBBBBBBBBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBBBBBBBBBBBBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAAAAAAAAAAAAAAAAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAAAAAAAAAAAAAAAAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAAAAAAAAAAAAAAAAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBB      BBB      AAA      AAA      SSS      SSS      RRR      RRR      TTT      TTT      LLL
BBBBBBBBBBBBBB      AAA      AAA      SSSSSSSSSSSSSS      RRR      RRR      TTT      TTT      LLL
BBBBBBBBBBBBBB      AAA      AAA      SSSSSSSSSSSSSS      RRR      RRR      TTT      TTT      LLL
BBBBBBBBBBBBBB      AAA      AAA      SSSSSSSSSSSSSS      RRR      RRR      TTT      TTT      LLL
LLLLLLLLLLLLLLLLLLLL
```

```
BBBBBBBBB      AAAAAA      SSSSSSSS      IIIIII      NN      NN      IIIIII      GGGGGGGG      SSSSSSSS      CCCCCCCC
BBBBBBBBB      AAAAAA      SSSSSSSS      IIIIII      NN      NN      IIIIII      GGGGGGGG      SSSSSSSS      CCCCCCCC
BB      BB      AA      AA      SS      SS      NN      NN      II      II      GG      SS      CC
BB      BB      AA      AA      SS      SS      NN      NN      II      II      GG      SS      CC
BB      BB      AA      AA      SS      SS      NNNN      NN      II      II      GG      SS      CC
BB      BB      AA      AA      SSSSSS      SS      NN      NN      II      II      GG      SSSSSS      CC
BB      BB      AA      AA      SSSSSS      SS      NN      NN      II      II      GG      SSSSSS      CC
BB      BB      AAAAAAAAAA      SS      NN      NN      II      II      GG      SS      CC
BB      BB      AAAAAAAAAA      SS      NN      NN      II      II      GG      SS      CC
BB      BB      AA      AA      SS      SS      NN      NN      II      II      GG      SS      CC
BB      BB      AA      AA      SSSSSSSS      SS      NN      NN      IIIIII      GGGGGG      SSSSSSSS      CCCCCCCC
BBBBBBBBB      AA      AA      SSSSSSSS      IIIIII      NN      NN      IIIIII      GGGGGG      SSSSSSSS      CCCCCCCC
                                     ....
                                     ....
                                     ....
                                     ....

LL      IIIIII      SSSSSSSS
LL      IIIIII      SSSSSSSS
LL      II      SS
LL      II      SS
LL      II      SS
LL      II      SS
LL      II      SSSSSS
LL      II      SSSSSS
LL      II      SS
LL      II      SS
LL      II      SS
LL      IIIIII      SSSSSSSS
LLLLLLLLLLL      IIIIII      SSSSSSSS
LLLLLLLLLLL      IIIIII      SSSSSSSS
```

```
1 0001 0 MODULE BASSINIT_C_GSB (
2 0002 0 IDENT = '1-005'
3 0003 0 ) =
4 0004 1 BEGIN
5 0005 1
6 0006 1 *****
7 0007 1 *
8 0008 1 * COPYRIGHT (c) 1978, 1980, 1982, 1984 BY
9 0009 1 * DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.
10 0010 1 * ALL RIGHTS RESERVED.
11 0011 1 *
12 0012 1 * THIS SOFTWARE IS FURNISHED UNDER A LICENSE AND MAY BE USED AND COPIED
13 0013 1 * ONLY IN ACCORDANCE WITH THE TERMS OF SUCH LICENSE AND WITH THE
14 0014 1 * INCLUSION OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE OR ANY OTHER
15 0015 1 * COPIES THEREOF MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE TO ANY
16 0016 1 * OTHER PERSON. NO TITLE TO AND OWNERSHIP OF THE SOFTWARE IS HEREBY
17 0017 1 * TRANSFERRED.
18 0018 1 *
19 0019 1 * THE INFORMATION IN THIS SOFTWARE IS SUBJECT TO CHANGE WITHOUT NOTICE
20 0020 1 * AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT
21 0021 1 * CORPORATION.
22 0022 1 *
23 0023 1 * DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS
24 0024 1 * SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.
25 0025 1 *
26 0026 1 *****
27 0027 1
28 0028 1
29 0029 1
30 0030 1
31 0031 1 ++
32 0032 1 FACILITY: BASIC-PLUS-2 Frame Support
33 0033 1
34 0034 1 ABSTRACT:
35 0035 1
36 0036 1 These routines set up and tear down frames for BASIC-PLUS-2.
37 0037 1 Frames are used for main routines, external functions,
38 0038 1 external subroutines, internal functions (both DEFs and DEF*s)
39 0039 1 internal subroutines (GOSUBs) and condition handlers.
40 0040 1
41 0041 1 ENVIRONMENT: VAX-11 user mode
42 0042 1
43 0043 1 AUTHOR: John Sauter, CREATION DATE: 10-Oct-78
44 0044 1
45 0045 1 MODIFIED BY:
46 0046 1
47 0047 1 1-001 - Original. JBS 10-Oct-78
48 0048 1 1-002 - Increment SP, not .SP. JBS 02-JAN-1979
49 0049 1 1-003 - Change stack frame prefixes from BASS$ to BSF$. JBS 08-FEB-1979
50 0050 1 1-004 - Set the IV bit in the PSW if requested. JBS 11-SEP-1979
51 0051 1 1-005 - Add support for the OTHERWISE clause. An optional parameter
52 0052 1 specifying the address to go to has been added. PLL 18-Mar-1982
53 0053 1 --
54 0054 1
55 0055 1
56 0056 1 <BLF/PAGE>
```



```

58 0057 1  |
59 0058 1  | SWITCHES:
60 0059 1  |
61 0060 1  |
62 0061 1  | SWITCHES ADDRESSING_MODE (EXTERNAL = GENERAL, NONEXTERNAL = WORD_RELATIVE);
63 0062 1  |
64 0063 1  |
65 0064 1  | LINKAGES:
66 0065 1  |
67 0066 1  |
68 0067 1  | LINKAGE
69 0068 1  |     BAS$GOSUB LINK = CALL (STANDARD) :
70 0069 1  |     GLOBAL (BSF$A_MAJOR_STG = 11, BSF$A_MINOR_STG = 10, BSF$A_TEMP_STG = 9),
71 0070 1  |
72 0071 1  |     BAS$GOSUB JSB = JSB :
73 0072 1  |     GLOBAL (BSF$A_MAJOR_STG = 11, BSF$A_MINOR_STG = 10, BSF$A_TEMP_STG = 9)
74 0073 1  |     NOTUSED (8, 7, 6, 5, 4, 3, 2)
75 0074 1  |     NOPRESERVE (1, 0);
76 0075 1  |
77 0076 1  |
78 0077 1  | TABLE OF CONTENTS:
79 0078 1  |
80 0079 1  |
81 0080 1  | FORWARD ROUTINE
82 0081 1  |     BAS$INIT_C_GSB : BAS$GOSUB_LINK NOVALUE;      ! start computed GOSUB
83 0082 1  |
84 0083 1  |
85 0084 1  | INCLUDE FILES:
86 0085 1  |
87 0086 1  |
88 0087 1  | REQUIRE 'RTLIN:RTLPSECT';                          ! macros for defing psects
89 0182 1  |
90 0183 1  | REQUIRE 'RTLIN:BASFRAME';                          ! Define frame structure
91 0386 1  |
92 0387 1  | LIBRARY 'RTLSTARLE';                              ! Define system symbols
93 0388 1  |
94 0389 1  |
95 0390 1  | MACROS:
96 0391 1  |
97 0392 1  |     NONE
98 0393 1  |
99 0394 1  | EQUATED SYMBOLS:
100 0395 1  |
101 0396 1  |     NONE
102 0397 1  |
103 0398 1  | PSECTS:
104 0399 1  |
105 0400 1  | DECLARE_PSECTS (BAS);                              ! declare psects for BAS$ facility
106 0401 1  |
107 0402 1  | OWN STORAGE:
108 0403 1  |
109 0404 1  |     NONE
110 0405 1  |
111 0406 1  | EXTERNAL REFERENCES:
112 0407 1  |
113 0408 1  |
114 0409 1  | EXTERNAL ROUTINE

```

BASSINIT\_C\_GSB  
1-005

F 4  
16-Sep-1984 00:37:00  
14-Sep-1984 11:55:07

VAX-11 Bliss-32 V4.0-742  
[BASRTL.SRC]BASINIGSC.B32;1

Page 3  
(2)

```
: 115      0410 1      BASS$SIGNAL : NOVALUE,          ! signals error
: 116      0411 1      BASS$HANDLER;                  ! handles signals
: 117      0412 1
: 118      0413 1
: 119      0414 1      ! The following are the error codes used in this module.
: 120      0415 1
: 121      0416 1
: 122      0417 1      EXTERNAL LITERAL
: 123      0418 1      BASS$K_ON_STAOUT : UNSIGNED (8);    ! On statement out of range
: 124      0419 1
```

```
126 0420 1 GLOBAL ROUTINE BASSINIT_C_GSB (
127 0421 1     TABLE,
128 0422 1     INDEX,
129 0423 1     OTHERWISE_ADDR
130 0424 1 ) : BASSGOSUB_LINK NOVALUE =
131 0425 1
132 0426 1
133 0427 1 ++
134 0428 1 FUNCTIONAL DESCRIPTION:
135 0429 1     Compute the index for a computed GOSUB. Then perform GOSUB
136 0430 1     processing, just like BASSINIT_GOSUB.
137 0431 1
138 0432 1 FORMAL PARAMETERS:
139 0433 1
140 0434 1     TABLE.rx.r      A table of offsets to the lines starting
141 0435 1                    each subroutine. The first longword is
142 0436 1                    the number of entries in the table, each
143 0437 1                    entry occupies a word.
144 0438 1     INDEX.rl.v        The index into the table. If this is out
145 0439 1                    of range we get an error message.
146 0440 1     [OTHERWISE_ADDR.rl.v] optional parameter - address of where
147 0441 1                    to go if the user specified OTHERWISE
148 0442 1
149 0443 1 IMPLICIT INPUTS:
150 0444 1
151 0445 1     NONE
152 0446 1
153 0447 1 IMPLICIT OUTPUTS:
154 0448 1
155 0449 1     NONE
156 0450 1
157 0451 1 ROUTINE VALUE:
158 0452 1
159 0453 1     NONE
160 0454 1
161 0455 1 COMPLETION CODES:
162 0456 1
163 0457 1     NONE
164 0458 1
165 0459 1 SIDE EFFECTS:
166 0460 1
167 0461 1     Leaves lots of things on the stack for use by the compiled
168 0462 1     BASIC-PLUS-2 code. These things will be removed by
169 0463 1     BASSEND_GSB_R8.
170 0464 1
171 0465 1 --
172 0466 1
173 0467 2 BEGIN
174 0468 2
175 0469 2 + The following external registers are merely passed through to
176 0470 2 the compiled code.
177 0471 2 -
178 0472 2
179 0473 2 EXTERNAL REGISTER
180 0474 2     BSFSA_MAJOR_STG,
181 0475 2     BSFSA_MINOR_STG,
182 0476 2     BSFSA_TEMP_STG;
```



```
183 0477 2
184 0478
185 0479 BUILTIN
186 0480   FP,
187 0481   SP,
188 0482   BISPSW,
189 0483   ACTUALCOUNT;
190 0484
191 0485 LITERAL
192 0486   K_ADDR_ARG = 3;                                ! position of addr arg
193 0487
194 0488 !+ Define local variables as registers. We cannot have any stack
195 0489 !- locals since we manipulate the stack pointer in this routine.
196 0490
197 0491
198 0492 REGISTER
199 0493   FMP : REF BLOCK [0, BYTE] FIELD (BSF$FCD),           ! pointer to FCD
200 0494   PREV_FMP : REF BLOCK [0, BYTE] FIELD (BSF$FCD),      ! points to previous frame
201 0495   NEW_PC;                                           ! PC of start of subroutine
202 0496
203 0497 !+
204 0498 !- Check for the index being out of range.
205 0499
206 0500   IF ((.INDEX LEQ 0) OR (.INDEX GTR ..TABLE))
207 0501   THEN
208 0502   BEGIN
209 0503   IF ACTUALCOUNT () EQL K_ADDR_ARG
210 0504   THEN
211 0505   NEW_PC = .OTHERWISE_ADDR
212 0506   ELSE
213 0507   BASS$SIGNAL (BASS$K_ON_STAOUT);
214 0508   END
215 0509   ELSE
216 0510   !+
217 0511   !- Fetch the PC of the head of the subroutine selected by the index.
218 0512
219 0513   NEW_PC = .BLOCK [.TABLE, (.INDEX*2) + 2, 0, 16, 1; 0, BYTE] + .TABLE;
220 0514
221 0515   !+
222 0516   !- Allocate frame control data.
223 0517
224 0518   FMP = .FP;
225 0519   SP = .FMP - BSF$K_LENFCDSB;
226 0520
227 0521   !+
228 0522   !- Initialize the parts of the FCD relevant to a GOSUB.
229 0523
230 0524   FMP [BSF$A_MARK] = 0;
231 0525   FMP [BSF$A_BASE_SP] = .SP;
232 0526   FMP [BSF$A_BASE_R11] = .BSF$A_MAJOR_STG;
233 0527   FMP [BSF$A_BASE_R10] = .BSF$A_MINOR_STG;
234 0528   FMP [BSF$A_BASE_R9] = .BSF$A_TEMP_STG;
235 0529
236 0530   !+ The 'PROCEDURE ID' is the address of the start of the GOSUB.
237 0531
238 0532   FMP [BSF$A_PROC_ID] = .NEW_PC;
239 0533   !+
240 0534   !- Copy the frame flags from the previous frame. The previous
```

! of BASSINIT\_C\_GSB

```

.ENTRY      BASSINIT C_GSB, Save R2
MOVL       INDEX, R0
BLEQ       1$
CML        R0, @TABLE
BLEQ       3$
CMPB       (AP), #3
BNEQ       2$
MOVL       OTHERWISE_ADDR, NEW_PC
BRB        4$
MOVZBL     #BASSK ON STAOUT, -(SP)
CALLS      #1, BASS$SIGNAL
BRB        4$
MOVAW      @TABLE[R0], R0
CVTWL      2(R0), NEW_PC
ADDL2      TABLE, NEW_PC
MOVL       FP, FMP
MOVAB      -32(R0), SP
CLRL       -4(FMP)
MOVL       SP, -8(FMP)
MOVQ       BSF$A_MINOR_STG, -16(FM

```

Address	Hex	ASCII	Hex	ASCII	Hex	ASCII
	50		08	AC	0004	00000
				D0		00002
				06	15	00006
04	BC			50	D1	00008
				18	15	0000C
	03			6C	91	0000E 1%:
				06	12	00011
	52		0C	AC	D0	00013
				1A	11	00017
	7E		00G	8F	9A	00019 2%:
00000000G	00			01	FB	0001D
				0D	11	00024
	50		04	BC40	3E	00026 3%:
	52		02	A0	32	0002B
	52		04	AC	C0	0002F
	50			5D	D0	00033 4%:
	5E		E0	A0	9E	00036
			FC	A0	D4	0003A
FB	A0			5E	D0	0003D
FO	A0			5A	7D	00041

0420  
0500  
0503  
0505  
0507  
0500  
0513  
0518  
0519  
0523  
0524  
0526



EC	A0	59	D0	00045	MOVL	BSFSA TEMP STG, -20(FMP)	0527	
E8	A0	52	D0	00049	MOVL	NEW_PC, -2(FMP)	0531	
	S1	OC	A0	D0	0004D	MOVL	12(FMP), PREV_FMP	0536
E6	A0	E6	A1	B0	00051	MOVW	-26(PREV_FMP), -26(FMP)	0537
E4	A0	0620	8F	B0	00056	MOVW	#1568, -28(FMP)	0546
E6	A0		0B	E1	0005C	BBC	#11, -26(FMP), 5\$	0548
		60 00000000G	20	B8	00061	BISPSW	#32	
			00	9E	00063	MOVAB	BASSHANDLER, (FMP)	0554
			62	16	0006A	JSB	(NEW_PC)	0559
			04	0006C	RET			0560

; Routine Size: 109 bytes, Routine Base: \_BASSCODE + 0000

:	267	0561	1	
:	268	0562	1	END
:	269	0563	1	
:	270	0564	0	ELUDOM

## PSECT SUMMARY

Name	Bytes	Attributes
_BASSCODE	109	NOVEC,NOWRT, RD , EXE, SHR, LCL, REL, CON, PIC,ALIGN(2)

## Library Statistics

File	----- Total	Symbols Loaded	----- Percent	Pages Mapped	Processing Time
_\$255\$DUA28:[SYSLIB]STARLET.L32:1	9776	1	0	581	00:01.1

## COMMAND QUALIFIERS

; BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/NOTRACE/LIS=LIS\$:BASINIGSC/OBJ=OBJ\$:BASINIGSC MSRC\$:BASINIGSC/UPDATE=(ENH\$:BASINIGSC)

Size:	109 code + 0 data bytes
Run Time:	00:06.2
Elapsed Time:	00:17.5
Lines/CPU Min:	5458
Lexemes/CPU-Min:	19083
Memory Used:	72 pages

BASSINIT\_C\_GSB  
1-005

<sup>K 4</sup>  
16-Sep-1984 00:37:00

VAX-11 Bliss-32 V4.0-742

Page 8

: Compilation Complete



0024 AH-BT13A-SE  
VAX/VMS V4.0

DIGITAL EQUIPMENT CORPORATION  
CONFIDENTIAL AND PROPRIETARY

BASINIGSC  
LIS

BASINIT  
LIS

BASINIDEF  
LIS

BASINIDFS  
LIS

BASINIGSB  
LIS

BASINSTR  
LIS

BASINTONE  
LIS

BASLEFT  
LIS

BASMARGIN  
LIS

BASINTOL  
LIS

BASKILL  
LIS

BASTOBEG  
LIS

BASTOEND  
LIS

BASMATADD  
LIS

BASMATAP  
LIS